

Case Report

Pasteurella multocida Bacteremia in a Patient with Diabetic Foot Infection

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Abstract

Human infection by *Pasteurella multocida* is commonly associated with cat or dog bite. This is the case report of a 57-year-old lady with chronic diabetes mellitus and hypertension presented with non-healing left leg ulcer for three weeks duration. A *Pasteurella multocida* bacterium was isolated in the Microbiology Laboratory from her blood specimen. Diagnosis and management of the patient are discussed.

Keywords: Ampicillin-sulbactam; bacteremia; diabetes mellitus; *Pasteurella multocida*

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Introduction

Diabetes cases have been increasing; the latest study showed that the prevalence of type 2 diabetes in Malaysia is 16.6%¹. Foot infection can be one of the complications of the long-standing diabetes. Gram-positive and gram-negative bacteria have been implicated in this infection, however, *Pasteurella multocida* is not among the common pathogen isolated. *Pasteurella multocida* is a non-fermentative, gram-negative cocco-bacillus bacterium that is known to cause human infection and is commonly associated with bite or scratch from the domestic animals such as cats and dogs. This organism is part of the cat and dog's mouth normal flora or commensal.

Case Report

Mrs. SJ, 57-year-old India Lady with longstanding underlying diabetes mellitus and hypertension presented with non-healing ulcer at the left heel for three weeks duration. While in the Emergency Department she developed one episode of seizure, which aborted spontaneously. CT scan of the brain showed no abnormality. The ulcer at the left heel measured about 1.5cm in size. There was minimal pus discharged noted. There was another ulcer noted at the lateral side of the left knee, which measured about 0.5cm in diameter. This ulcer showed no pus discharged and no inflammatory changes on the

surrounding skin. She did not complaint of fever but she felt dizzy. Apart from that she did not have other symptoms.

She was admitted to the ward for further investigation and management of the ulcers. The blood samples were taken for analysis, which include full blood count, C-reactive protein, HBA1c, serum urea and electrolytes, serum creatinine, and also for Microbiological investigations. The results of the laboratory investigations were showed in Table 1. Radiological investigation of the left leg showed no evidence of acute osteomyelitis. The empirical antibiotic therapy with intravenous ampicillin-sulbactam was initiated at the dosage of 1.5 grams 12-hourly. Microbiology report for the blood sample revealed the growth of *Pasteurella multocida* organism. The organism grew well on blood agar but fail to grow on MacConkey agar. It produced non-hemolytic colonies and the oxidase test was positive. The identification is confirmed by API20NE (biomerieux hazelwood, Mo.) identification test. This organism was shown to be susceptible to ampicillin hence the intravenous ampicillin-sulbactam was continued for the treatment of the infection. Apart from that her diabetes and hypertension medications that include metformin 1 grams 8-hourly, atenolol 100 mg daily, enalapril 10 mg daily, aspirin 100 mg

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daily and clopidogrel 75mg daily were continued. Upon further questioning, she did not give any history of animal bites or licked on her wound.

gram-negative bacteria isolated were *Proteus* spp., *Pseudomonas aeruginosa*, *Klebsiella pneumonia* and *Escherichia coli*². *Pasteurella multocida* is not

Table 1: Total white blood cells, Neutrophils count and C-reactive protein (CRP) results from day of admission until day of discharge

	Day 1	Day 2	Day 3	Day 7	Day 10	Day 14	Day 16	Day 20	Day of discharge
Total White Blood cells (x 10 ⁹ /L)	36.3	24.5	19.8	26.4	27.1	18.6	14.4	9.2	5.7
Neutrophils (x 10 ⁹ /L)	33.4	22.4	17.2	24.0	30.2	21.0	16.8	6.9	3.8
C-reactive protein (g/L)	34.2	35.5	19.9	22.3	22.3	20.5	15.5	-	1.8

among the common gram-negative bacteria isolated in this population of patient. Perhaps, isolation of *Pasteurella multocida* required specific contact with the animal particularly domestic animals such as cats and dogs. The bacteria can also be acquired by inhalation. However,

Despite on appropriate antibiotic therapy, her wound did not heal appropriately. On day 7 of admission, culture of the pus from the ulcer revealed the growth of *Klebsiella pneumoniae*. The bacteria noted to produce Extended Spectrum Beta Lactamase (ESBL). The antibiotic was changed to intravenous imipenem 1 grams 8-hourly. The wound was noted to progress to the left plantar abscess with ascending cellulitis. Multiple wound debridement were performed but her condition did not improve satisfactorily that ended with amputation of the left leg at the below knee level. She was continued on intravenous imipenem and completed the antibiotic for 14 days. She was discharged on the day 10-post operation. Wound inspection of the amputation stump showed a clean wound.

Discussion

The prevalence of the type 2 diabetes is increasing from year to year. The latest data shows that the prevalence of this type 2 diabetes in Malaysia is at 16.6%¹. Patient with long-standing diabetes develop several complications and diabetic foot infection is one of them. This case highlighted the scenario, which occurred as result of the long-standing diabetes with foot infection.

Microbiological study of the diabetic foot infection revealed that both gram-positive and gram-negative bacteria have been contributed to this infection. In some of the cases the infection can be polymicrobial in nature. Local study in a teaching hospital in Malaysia had shown that the gram-negative bacteria contributed to 52% of the isolated aetiological agent of the diabetic foot infection. The main

in our case the history of contact with these animals were not established. Probably, this patient had the contact with the neighbor’s pets that causing the bacteria to colonize the pre-existing wound on her leg and subsequently resulted in diabetic foot infection. *Pasteurella multocida* have been reported to cause variety of human infections. The infections can be localized or systematic. Respiratory tract infections (61.5%) contribute to the most of the infections followed by soft tissue infections (30.8%) and septicaemia (7.7%)³. In 88% of the bacteremia cases the localized sites of infection were identified mainly as intra-abdominal infection, meningitis, pneumonitis and wound infections⁴. Among the *Pasteurella multocida* species, *P. multocida* subspecies *multocida* and *P. multocida* subspecies *septic* share very similar biochemical profiles but they tend to cause infections at the different site. *Pasteurella multocida* subspecies *multocida* is likely to cause respiratory tract infections while *P. multocida* subspecies *septic* is likely to cause wound infections⁵. In this case the patient had bacteremia most likely originating from the left foot infections. The treatment and management for this patient required a multidisciplinary approach. Study by Christidou et al showed that the bacteria are susceptible to beta-lactams antibiotic, quinolones, chloramphenicol, tetracycline and trimethoprim/sulfamethoxazole. The overall mortality rate for *Pasteurella multocida* infection was around 23%³. The patient in our case was given appropriate antibiotic therapy for *Pasteurella multocida* as the in-vitro susceptibility testing by disc-diffusion method

showed the organism is sensitive to ampicillin-sulbactam. Unfortunately the wound was infected by Extended Spectrum Beta Lactamase (SBL) Producing *Klebsiella Pneumoniae* and subsequently needed left leg amputation at the below knee level.

Conflict of interest: None declared

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